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STATE DOCUMENTS

Oil and Gas Conservation Commission OF THE STATE OF MONTANA

TIM BABCOCK
GOVERNOR



ANNUAL REVIEW FOR THE YEAR 1967

Relating to

OIL AND GAS

Volume 11

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Annual Review for the Year 1967 Volume 11

INTRODUCTION

This is the eleventh Annual Review of drilling and producing operations in Montana.

Oil production in Montana during 1967 was 34,959,000 barrels. This was not quite as high as the 1966 record production of 35,380,000 barrels. Estimated Montana recoverable reserves were considerably increased to 452 million barrels as compared to 393 million barrels a year ago.

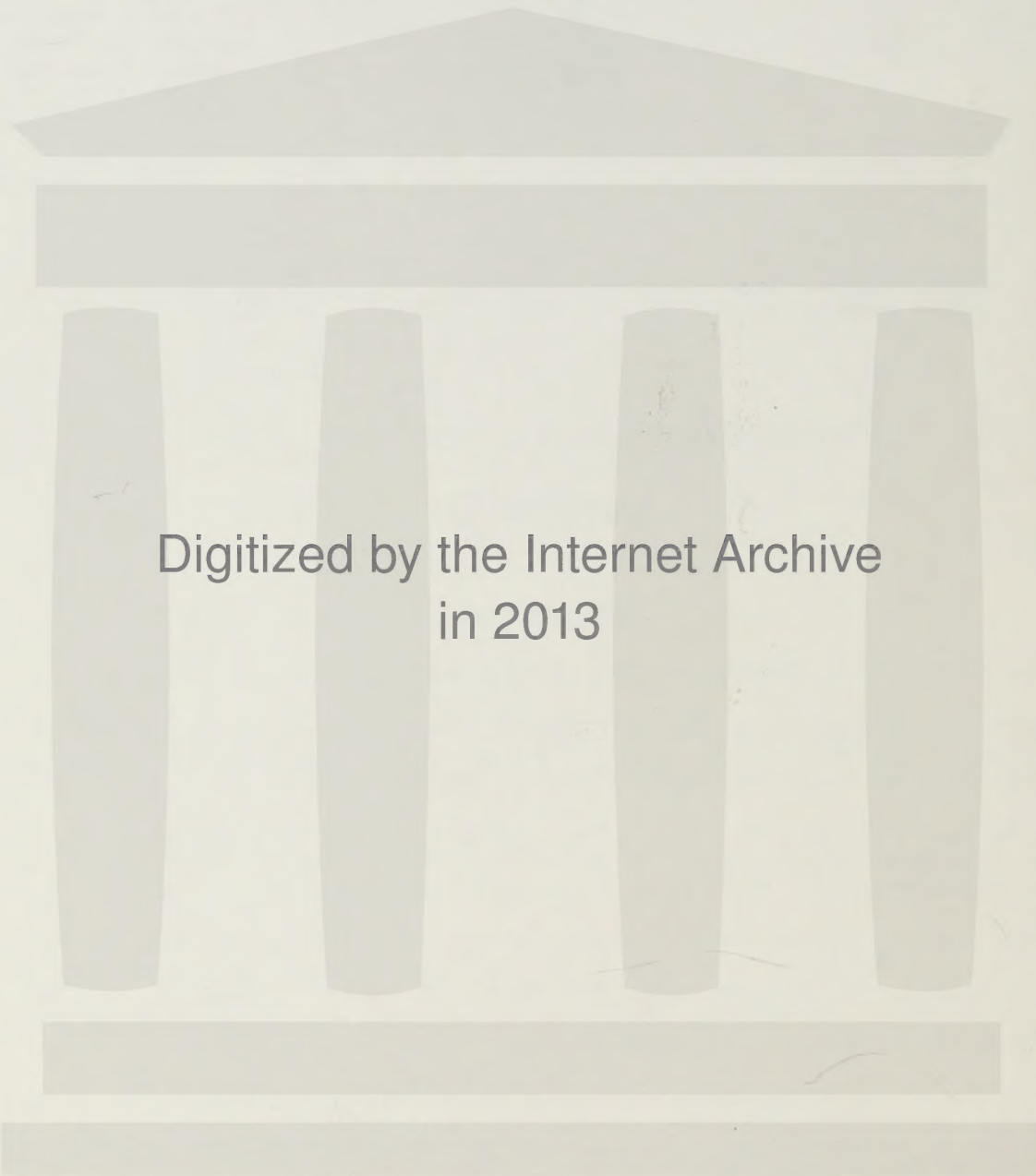
During 1967 there were 483 wells drilled in Montana. Of these, 203 were exploratory and 280 were development wells. Exploratory drilling resulted in 7 oil discoveries, 5 gas discoveries and 191 dry holes. Development drilling resulted in 162 oil wells, 14 gas wells and 104 dry holes.

There were several major discoveries in Montana during 1967. Most important was the extraordinary oil production found in the Muddy sand formation in the Powder River Basin in southeastern Montana. This discovery resulted in the delineation of the Bell Creek Field comprising 68 sections and touched off lease and drilling activity over the entire Powder River Basin. This activity started in the latter part of 1967 and was rapidly increasing by the year's end.

In eastern Montana the Winniepegosis formation was found to be productive in two Red River producing fields. Interest in the Winniepegosis was revived by the successful acid stimulation of an old well in the Redstone Field in northeastern Montana. There was also a significant discovery of oil from the Amsden formation in the old Cat Creek Field.

Exploratory efforts resulted in the discovery of large shallow gas reserves in the Eagle sand formation on the north flank of the Bearpaw Mountains in north central Montana. Approximately 28 gas wells were completed during 1967 in a three-county area. There is as yet no gas pipeline into the area.

Five waterflood projects were started in 1967. One large project in the Pine Field of Dawson and Prairie counties was still under construction at the end of the year. Approximately 5.2 million barrels, or 15 per cent, of total Montana production during 1967 was incremental production from secondary recovery projects.



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FIVE YEAR SUMMARY

	1963	1964	1965	1966	1967
Production, Northern Montana—Bbls.	4,530,510	5,705,948	6,826,261	7,991,302	6,758,280
South Central—Bbls.	3,383,587	3,699,927	3,597,647	3,392,890	3,181,132
Central—Bbls.	3,950,490	3,269,768	2,849,923	2,710,194	2,872,604
Williston Basin—Bbls.	19,005,066	17,971,855	19,504,287	21,285,732	20,475,733
Powder River Basin—Bbls.					1,671,277
TOTAL	30,869,653	30,647,498	32,778,118	35,380,118	34,959,026
No. of Producing Wells, Northern Montana					
South Central	2,550	2,216	2,649	2,308	2,097
Central	82	88	101	106	96
Williston Basin	310	317	306	301	286
Powder River Basin	700	708	754	792	802
TOTAL	3,642	3,329	3,810	3,507	3,390
Average Daily Production/Well—BOPD,					
Northern Montana	4.9	7.4	7.1	9.5	8.8
South Central	113.4	115.1	97.6	87.7	90.7
Central	34.8	28.8	25.5	24.7	27.5
Williston Basin	74.4	65.7	70.9	73.6	69.9
Powder River Basin					70.6
STATE AVERAGE	23.2	25.2	23.6	27.6	28.2
Development Wells Drilled, Oil Wells	131	100	177	179	162
Gas Wells	6	7	9	9	14
Dry Holes	60	109	107	96	104
TOTAL	197	216	293	284	280
Exploratory Wells Drilled, Oil Wells	8	22	14	10	7
Gas Wells	5	3	1	3	5
Dry Holes	152	150	199	185	191
TOTAL	165	175	214	198	203
TOTAL WELLS DRILLED	362	391	507	482	483
TOTAL FOOTAGE DRILLED	1,906,976	1,863,155	2,328,865	2,211,369	2,158,964
AVERAGE DEPTH OF ALL WELLS	5,268	4,765	4,593	4,588	4,470

SUMMARY OF DRILLING BY COUNTIES—1967
STATE OF MONTANA

County	Wildcats			Development			Total Wells Drilled	Footage Drilled	Avg. Depth Per Well
	Dry	Oil	Gas	Dry	Oil	Gas			
Big Horn	3	0	0	3	3	0	9	39,587	4,399
Blaine	24	0	1	7	0	7	39	74,274	1,904
Carbon	5	1	0	0	3	0	9	29,745	3,305
Carter	15	0	1	0	0	1	17	74,979	4,411
Cascade	1	0	0	0	0	0	1	4,892	4,892
Chouteau	4	0	1	0	0	0	5	12,654	2,531
Custer	2	0	0	1	0	1	4	20,618	5,155
Daniels	1	1	0	4	4	0	10	72,604	7,260
Dawson	2	0	0	2	8	0	12	121,975	10,165
Fallon	0	0	0	1	7	0	8	70,567	8,821
Fergus	1	0	0	0	0	0	1	5,990	5,990
Garfield	4	0	0	0	0	0	4	24,664	6,166
Glacier	5	0	0	9	12	2	28	87,028	3,108
Hill	9	0	0	6	0	1	16	42,397	2,650
Liberty	12	0	1	4	3	1	21	59,882	2,852
McCone	3	0	0	2	0	0	5	33,052	6,610
Musselshell	8	1	0	8	6	0	23	116,335	5,058
Petroleum	3	0	0	0	1	0	4	15,235	3,809
Phillips	5	0	0	0	0	0	5	16,380	3,276
Pondera	12	0	0	3	3	0	18	45,052	2,503
Powder River	18	1	1	12	86	1	119	561,177	4,716
Prairie	0	0	0	1	0	0	1	9,135	9,135
Richland	2	0	0	1	2	0	5	59,600	11,920
Roosevelt	3	1	0	5	1	0	10	74,370	7,437
Rosebud	7	0	0	4	3	0	14	67,794	4,842
Sheridan	9	1	0	8	10	0	28	225,390	8,050
Stillwater	1	1	0	0	1	0	3	6,955	2,318
Teton	4	0	0	0	0	0	4	10,505	2,626
Toole	24	0	0	21	7	0	52	218,031	2,462
Treasure	1	0	0	0	0	0	1	5,893	5,893
Valley	1	0	0	0	0	0	1	4,900	4,900
Yellowstone	2	0	0	2	2	0	6	37,304	6,217
TOTALS	191	7	5	104	162	14	483	2,158,964	4,470

TOTAL
95,778

CRUDE OIL PRODUCTION 1942-1967

PERCENT

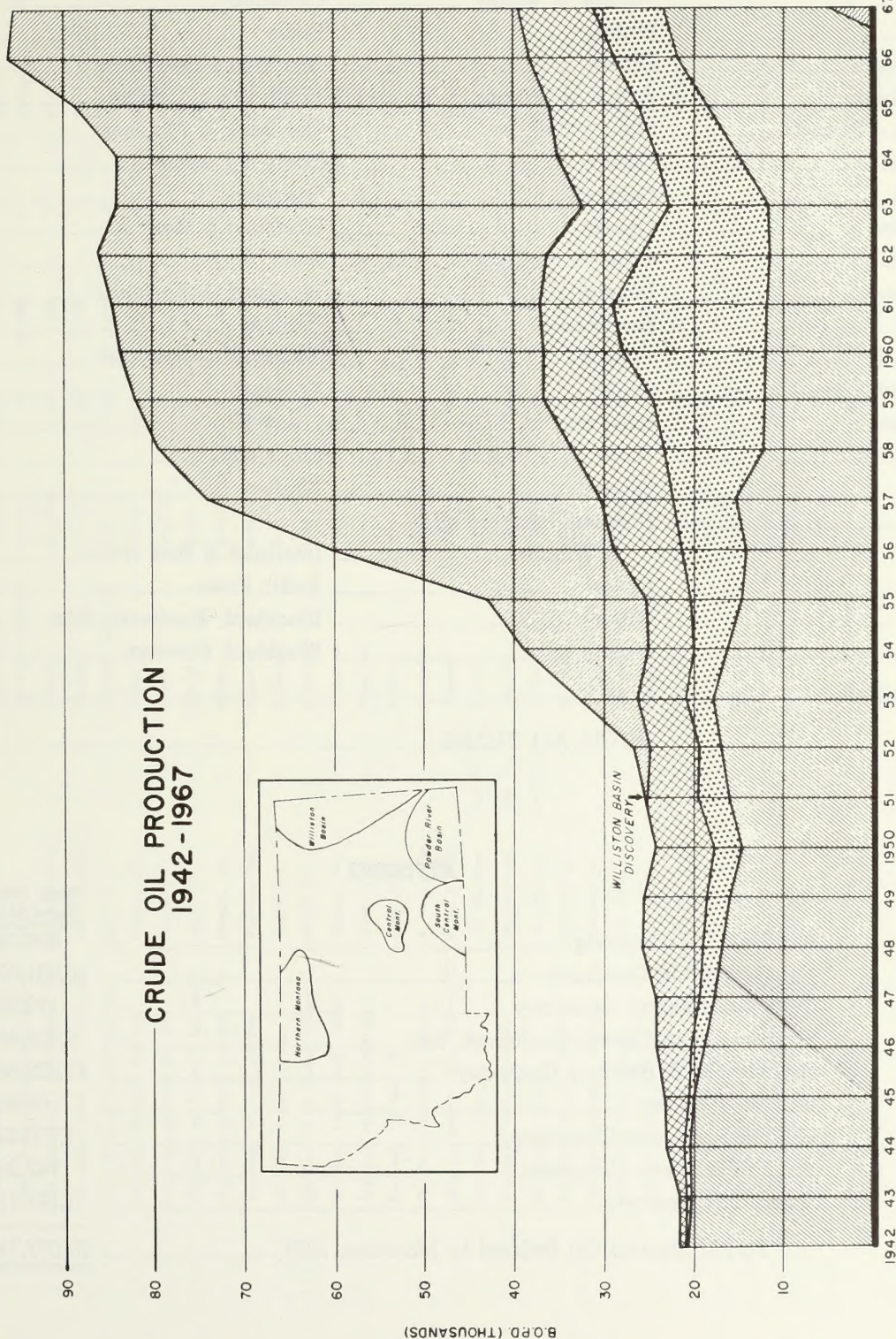
WILLISTON
BASIN
58.6

SOUTH
CENTRAL
MONTANA
9.1

CENTRAL
MONTANA
8.2

NORTHERN
MONTANA
19.3

POWDER RIVER
BASIN
4.8



B.O.P.D. (THOUSANDS)

MONTANA
GAS PRODUCTION DATA—1967

Field	County	Producing Formations	1967 Production M.C.F.
Big Coulee	Golden Valley & Stillwater.....	Lakota & Morrison	987,982
Bowdoin	Phillips & Valley.....	Colorado	2,071,723
Bowes	Blaine	Eagle	569,069
Cabin Creek	Fallon	Interlake & Red River	1,280,122
Cedar Creek	Fallon & Wibaux	Judith River & Eagle	3,248,019
Cut Bank & Reagan.....	Glacier & Toole	Cut Bank & Madison	9,497,010
Dry Creek	Carbon	Eagle & Frontier	418,735
Elk Basin	Carbon	Tensleep	1,265,902
Flat Coulee	Liberty	Blackleaf & Swift	118,397
Gold Butte	Toole	Swift	28,216
Grandview	Liberty	Blackleaf & Kootenai	86,517
Hardin	Big Horn	Frontier	43,377
Keith Block	Liberty	Blackleaf & Sawtooth	3,577,914
Kevin Sunburst	Toole	Kootenai	647,816
Lake Basin	Stillwater	Frontier	1,275,934
Middle Butte	Toole	Blackleaf	29,759
Mt. Lilly	Liberty	Madison	328,053
Pine	Dawson, Prairie, Fallon & Wibaux	Interlake & Red River	820,433
Plevna	Fallon	Judith River	139,162
Utopia	Liberty	Blackleaf, Kootenai, Ellis.....	1,063,949
Whitlash	Liberty	Blackleaf, Kootenai	1,493,870
Miscellaneous.....			2,005,595
TOTAL ALL FIELDS.....			<u>30,997,554</u>

REFINING

	Year 1967 Total Bbls.
Big West Oil Company.....	966,769
Continental Oil Company.....	10,801,598
Diamond Asphalt Company.....	172,705
Farmers Union Central Exchange, Inc.....	7,439,467
Humble Oil & Refining Company.....	13,923,889
Jet Fuel Refinery.....	64,619
Phillips Petroleum Company.....	1,770,236
Tesoro Petroleum Company.....	747,308
Union Oil Company.....	1,191,156
TOTAL Barrels Oil Refined in Montana, 1967.....	<u>37,077,747</u>

SUMMARY OF ACTIVE SECONDARY RECOVERY PROJECTS (DATE EFFECTIVE TO JANUARY 1, 1968)

Field, Formation	Operator	Type of Project	Injection Pattern	Date Injections Commenced	Cumulative Injections 1000's Bbls. or MCF	Dec. 1967 Avg. Daily Injection Rate	No. of Injection Wells	Source of Injection Media & Remarks
Ash Creek, Shannon	McDermott	Waterflood	Periphial	10-15-64	384	381	4	Parkman, Data for Montana portion.
Big Wall, Tyler B	Texaco, Inc.	"	Modified Periphial	8-20-66	2,553	4,737	3	Produced water from Amsden & Tyler
Bowes, Sawtooth	Texaco, Inc.	"	Dispersed Pilot	5-23-61	2,193	1,928	5	Madison
Cabin Creek, Siluro-Ordovician	Shell Oil	"	Modified Periphial	6-12-59	21,774	20,885	16	Produced Water & Fox Hills
Cat Creek, 1st & 2nd CC (Unit 1)	Continental Oil	"	Periphial	10-10-62	5,692	2,795	4	Third Cat Creek
Cat Creek, 1st & 2nd CC (Unit 2)	Continental Oil	"	Periphial	12-1-59	14,999	2,638	8	Third Cat Creek
Coral Creek, Siluro-Ordovician	Shell Oil	"	Modified Periphial	4-67	1,263	5,834	9	Minnelusa
Cut Bank, NE Unit, Cut Bank	Texaco, Inc.	"	5-Spot	9-2-63	6,632	2,147	33	Madison
Cut Bank, NW Unit, Cut Bank	Humble Oil	"	5-Spot	1-30-62	8,121	5,386	31	Madison
Cut Bank, So. Central, Cut Bank	Union Oil	"	5-Spot	5-63	10,243	7,636	39	Madison
Cut Bank, SE Unit, Cut Bank	Texaco, Inc.	"	5-Spot	4-62	14,819	14,053	49	Madison
Cut Bank, SW Unit, Cut Bank	Phillips Petr.	"	5-Spot	9-62	7,553	10,555	55	Madison
Cut Bank, Tribal, Lander	Humble Oil	"	Dispersed	6-51	4,260	184	3	Eagle
Cut Bank, H. C. Lander, Lander	Humble Oil	"	Dispersed	4-65	533	504	2	Eagle
Cut Bank, Lander Sand, Lander	Texaco, Inc.	"	Dispersed	7-64	1,640	2,024	6	Eagle
Cut Bank, McGuiness-Noulton	Union Oil	"	Dispersed	12-62	1,399	807	1	Madison
Cut Bank, Cut Bank SS	Miami Oil	"	5-Spot	12-67	18	17,860	15	Madison
Darling, State Unit, Moulton	B. G. & O. Co.	"	Dispersed	2-67	172	725	1	Madison
Darling, Swenson Unit, Moulton	B. G. & O. Co.	"	Dispersed	2-67	404	1,220	2	Madison
Elk Basin, Frontier	Pan American	Gas Inj.	Crestal	1926	All injection wells in Wyoming	Purchased Gas		
Elk Basin, Embar-Tensleep	Pan American	Gas Inj.	Crestal	1949	All injection wells in Wyoming	Inert Gas		
Elk Basin, Madison	Pan American	Waterflood	Periphial	1962	17,714	9,128	5	Madison
Elk Basin, NW Unit, Frontier	Sinclair Oil	"	Periphial	10-57	3,932	1,072	4	Madison
Elk Basin, NW Unit, Tensleep	Sinclair Oil	"	Modified Periphial	5-67	128	674	1	Produced Water-Madison
Keg Coulee West, Tyler B	Pan American	"	One Well Pilot	8-31-66	842	1,475	1	Madison
Kevin-Sunburst, Madison	Lon Crumley	"	Dispersed	9-63	319	295	1	Madison
Kevin-Sunburst, Madison	Texaco, Inc.	"	Periphial	8-64	2,122	2,286	10	Madison
Kevin-Sunburst, Madison	Juniper Oil	"	Dispersed	8-64	362	1,080	7	Madison
Kevin-Sunburst, Madison	Cardinal Petroleum	"	Dispersed	6-65	295	794	2	Madison
Little Beaver, Siluro-Ord.	Shell Oil	"	Semi-Periphial	8-7-66	3,097	7,000	12	Minnelusa
Little Beaver East, Siluro-Ord.	Shell Oil	"	Semi-Periphial	4-65	2,106	3,253	5	Minnelusa
Mosby Dome, Swift	Farmers Union	"	One Well Pilot	7-67	119	25,396	4	Third Cat Creek
Pine, Siluro-Ordovician	Shell Oil	"	Semi-Periphial	3-59	36,980	18,598	30	Fox Hills & Produced Water
Pondera, Madison	Phillips Petr.	"	Dispersed	8-61	799	206	2	Madison
Ragged Point, Tyler A	Juniper Oil	"	Modified Periphial	2-3-66	1,538	1,600	5	Third Cat Creek
Reagan, Madison	Union	Gas Inj.	Crestal	8-61	2,077	920	4	Produced Gas
Red Creek, Cut Bank	Humble Oil	Waterflood	5-Spot	6-65	2,123	3,333	9	Madison
Richey SW, Dawson Bay-Interlake	Sinclair Oil	"	Dispersed	12-65	711	1,340	3	Fox Hills
Stensvad, Tyler B	Pan American	"	Periphial	2-63	7,947	5,355	5	Mission Canyon

OIL AND GAS DISCOVERIES IN 1967

County	Operator—Well Name and Location	Field	Total Depth	Initial Potential Oil B/D	Initial Potential Gas MCF	Producing Formation
Blaine	High Crest Oil Co., O'Neil 1, SE NE 1-31N-17E	Tiger Ridge	1,340		3,100	Eagle
Carbon	Development Serv., George 1, SE SW 32-5S-18E	Dean Dome	2,890	26		Lakota
Carter	Sinclair Oil & Gas, Espy 6-1, SE SE 6-8S-55E	Bell Creek	4,476		15,000	Muddy
Chouteau	Union Texas Petroleum, Godfrey 1, NE SW 5-25N-16E	Unnamed	857		162	Madison
Daniels	Champlin Oil & Refining, R. Foster 1, NE NE 22-34N-50E	Smoke Creek	7,817	142		Charles "C"
Liberty	Pel-Tex Pet. Co., Inc., Anderson 1, SE NW 9-34N-4E	Grandview	2,696		118	Bow Island, Madison
Musselshell	McAlester Fuel Co., Drees 2-29, NW NE 29-10N-31E	Hiawatha	5,148	121		L. Tyler Stensvad
Powder River	Exeter Drilling, Hayes 1, NW NW 12-9S-54E	Unnamed	4,873		SI	Muddy
Powder River	Exeter Drilling, Federal-McCarrel 33-1, NE NE 33-8S-54E	Bell Creek	4,975	207		Muddy
Roosevelt	Murphy Oil Corp., Red Fox 1, SE NE 17-30N-48E	Tule Creek	7,774	443		Nisku
Sheridan	Jayhawk Exploration, Bonfield 1, NE NW 31-32N-58E	Unnamed	7,866	148		Ratcliffe
Stillwater	Farmers Union, Larson 12X-17, SW NW 17-5S-17E	Dean Dome	2,825	30		Greybull

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
ARCH APEX Blackleaf (Gas) (Cret.)	13	Strat.	Volumetric	(Blackleaf Gas Pool) 330' from legal subdivision; 2500' from any other drilling or producible gas well producing from the same reservoir; 75' topographic tolerance. (Order 4-60.)	None
ASH CREEK Shannon (Upper Cret.)	4	Anticline	Partial Water Drive and Depletion	Spacing waived within unitized portion of field except no well may be drilled closer than 660' from unit boundary. (Order 4-65.)	Waterflood started October, 1964. (Orders 22-64, 15-66.)
BANNATYNE Swift (Jurassic)	6	Anticline	Comb. Water Drive and Volumetric	Center of 10-acre tracts, 50' topographic tolerance. Commingling permitted. (Order 20-58.)	Pilot waterflood of Swift suspended in 1963.
Madison (Miss.)	3	Anticline	Water Drive		
BASCOM Tyler (L. Penn.)	1/	Structural	Depletion	State-wide. (Order 10-63.)	None
BEARS DEN Kootenai (L. Cret.)	7	Anticline	Depletion and Gas Cap Drive	State-wide.	None
BELL CREEK Muddy (Cret.)	184	Strat.	Depletion	40-acre spacing units with 150' topographic tolerance from center of quarter-quarter section, 300 barrel per well per day MER. Semi-annual bottom-hole pressure surveys. Quarterly gas-oil ratio tests. (Orders 37-67, 39-67, 50-67.)	None
BENRUD Nisku (Devonian)	1	Structural	Water Drive	(Nisku) 160-acre spacing units with permitted location within a 1320' square in center of quarter section. (Order 6-65.)	Water disposal into Judith River formation. (Order 64-62.)
BENRUD, EAST Nisku (Devonian)	1	Structural	Water Drive	(Nisku) Same as Benrud Field. (Order 6-65.)	Water disposal into Judith River formation. (Order 64-62.)
BENRUD, NORTHEAST Nisku (Devonian)	1	Structural	Water Drive	(Nisku) Same as Benrud Field. (Order 6-65.)	Water disposal into Judith River formation. (Order 32-66.)
BERTHELOTE Sunburst (L. Cret.)	1	Strat.	Depletion	(Sunburst) 40-acre spacing units with well no closer than 330' from lease or property line and not closer than 660' between wells. (Order 18-66.)	None

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules		Secondary Recovery or Water Disposal
BIG COULEE						
3rd Cat Creek (L. Cret.) (Gas)	3	Structural	Water Drive	State-wide.		None
Morrison (U. Jur.) (Gas)	3	Structural	Water Drive			
BIG WALL						
Amsden (Penn.)	4	Structural	Water Drive	Amsden and Tyler spaced by old state-wide spacing; 330' from lease or property line, 990' between wells in same reservoir. (Order 12-54.)		Previous disposal into Tyler "A" stopped in 1961. Waterflood of Tyler "B" sand started August, 1966. (Order 22-66.)
Tyler (Penn.)	18	Strat.	Depletion			
BLACKFOOT						
Cut Bank (L. Cret.)	5	Strat.	Depletion	(Cut Bank and Madison) One well only per 40-acre spacing unit. 300' tolerance from center of spacing unit.		None
Madison (Miss.)	8	Structural	Water Drive	Dual completion in Cut Bank and Madison with administrative approval. (Order 3-57.)		
BLACKFOOT, EAST						
Cut Bank (L. Cret.)	1	Strat.	Depletion	(Cut Bank) 40-acre spacing units. Location no closer than 330' from spacing unit boundary. (Order 41-65.)		None
BORDER						
Cut Bank (L. Cret.)	7	Strat.	Depletion	(Moulton, Sunburst & Cut Bank) Oil: 220' from boundary of legal subdivision and 430' between wells in same formation; 75' topographic tolerance.		None
Moulton (L. Cret.)	15	Strat.	Depletion	Gas: 330' from boundary of legal subdivision. 2400' between wells in same formation on same lease. 75' topographic tolerance. (Order 7-54.)		
BOWDOIN (Gas)						
Bowdoin & Phillips sands in Colorado (Cret.)	349	Structural	Volumetric	(Gas only) One well per quarter section not less than 1,000' from lease boundary or less than 2000' from any gas well in same horizon. (Order 29-55.)		None
BOWES						
Eagle (U. Cret.) (Gas)	21	Structural	Volumetric	(Eagle & Virgelle) (Gas) 660' from boundary of legal subdivision, 1320' from other wells in same formation, 75' topographic tolerance. (Order 23-54.)		None
Sawtooth (Jurassic)	57	Structural	Partial Water Drive	(Sawtooth) 330' from lease or property line, 990' between wells in same formation. (Order 13-54.)		Pilot waterflood initiated in 1961 and expanded to field-wide waterflood in 1965. (Order 5-61.)
BRADY						
Sunburst (L. Cret.)	5	Strat.	Depletion	(Brady Sand Pool) 10-acre spacing units with 75' topographic tolerance from center of spacing unit. (Order 34-62.)		None

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
CABIN CREEK Mission Canyon (Miss.)	20	Structural	Water Drive	Spacing waived and General Rules No. 213 (Deviation), 218 (Commingling), and 219 (Dual Completion) are suspended until present Unit Agreement becomes inoperative. (Order 36-62.)	Waterflood of Siluro-Ordovician reservoir has been expanded to a full scale peripheral flood. (Orders 60-62, 30-63.)
Interlake (Silurian)	85	Structural	Depletion		
Red River (Ordovician)					
CAT CREEK Kootenai (L. Cret.)	93	Structural	Depletion	(Kootenai, Morrison & Ellis) 220' from lease or property line, 440' from every other well in same formation. (Order 17-55.)	Two Kootenai waterfloods and one Ellis pilot waterflood in progress. (Orders 17-56, 18-59, 13-62.)
Morrison (U. Jur.)	7	Structural	Depletion	Amsden: State-wide.	
Ellis (U. Jur.)	45	Structural	Depletion		
Amsden (Penn.)	1	Structural	Unknown		
CEDAR CREEK Judith River (Gas)	176	Structural	Volumetric	(Judith River) Gas: 1200' from legal subdivision line, 2400' from every other well in same formation. (Order 33-54.)	None
Eagle (U. Cret.) (Gas)	62	Structural	Volumetric	(Eagle) 320-acre spacing units. Wells in center of NW¼ and SE¼ of each section with 200' topographic tolerance. (Order 1-61.)	None
CONRAD, SOUTH Dakota (L. Cret.)	2	Strat.	Depletion	(Dakota) 10-acre spacing units. Wells in center of each unit with 75' topographic tolerance. (Orders 34-62 & 31-63.)	None
CUPTON Red River (Ordovician)	1	Structural	Water Drive	(Red River) 80-acre spacing units consisting of E½ and W½ of quarter section; well location in SE¼ and NW¼ of quarter section with 75' topographic tolerance. (Order 31-55.)	None
CUT BANK Kootenai (L. Cret.)	1,139	Strat.	Depletion	(Moulton, Sunburst, Cut Bank, Madison) Oil: 330' from legal subdivision line. 650' between wells in same formation, 5-spot on 40-acre tract permitted. 75' topographic tolerance. (Order 10-54.)	There are 12 Kootenai sand waterfloods in progress.
Madison (Miss.)	39	Strat.	Water Drive	Gas: 330' from legal subdivision, 2400' between wells in same formation. 75' topographic tolerance. (Order 10-54.)	

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
DEER CREEK					
Interlake (Silurian)	2	Structural	Water Drive	(Interlake and Red River) 80-acre spacing units consisting of any two adjacent quarter-quarter sections. Well location in NE $\frac{1}{4}$ and SW $\frac{1}{4}$ of each quarter section with 75' topographic tolerance. (Orders 23-55 & 14-59.) Commingling of production permitted upon approval of Comm. Petr. Engr. (Order 18-63.)	Excess produced water is disposed into Dakota and Lakota formations. (Orders 6-56 & 3-58.)
Red River (Ordovician)	1	Structural	Water Drive		
DELPHIA					
Amsden (Penn.)	1	Structural	Water Drive	State-wide.	None
DEVIL'S BASIN					
Heath (U. Miss.)	Shut-in	Structural	Depletion	State-wide.	None
DEVON					
(Gas)					
Blackleaf (L. Cret.)	Shut-in	Strat.	Volumetric	State-wide	None
DRY CREEK					
Frontier (U. Cret.) (Gas)	1	Structural	Volumetric	State-wide.	None
Eagle (U. Cret.) (Gas)	1	Structural	Volumetric		
Greybull (L. Cret.) (Gas)	1	Structural	Volumetric		
Greybull (Cret.) (Oil)	1	Structural	Depletion		
DWYER					
Mission Canyon (Miss.)	15	Structural	Water Drive	(Madison) 160-acre spacing units; well location in SE $\frac{1}{4}$ of spacing unit with 75' topographic tolerance. (Orders 25-60, 29-61.)	Produced water disposed into Dakota formation. (Order 26-63.)
ELK BASIN (Mont. Portion)					
Frontier (U. Cret.)	5	Structural	Gravity Drainage	Rule No. 203 (Spacing) is waived within Unit Area. (Order 10-61.)	Frontier: Crestal gas injection. Embar-Tensleep: Pressure maintenance by crestal gas in injection. Waterflood approved in 1966.
Embar-Tensleep (Perm., Penn.)	27	Structural	Gravity Drainage		Madison: Water injection. Jefferson: None.
Darwin (Penn.)	1	Structural	Unknown		
Madison (Miss.)	24	Structural	Water Drive		
Jefferson (Dev.)	1	Structural	Water Drive		
ELK BASIN, NORTHWEST					
Frontier (U. Cret.)	6	Structural	Depletion	Spacing waived within unitized portion except that bottom of hole be no closer than 330' from unit boundary and there be at least 1320' surface distance between wells in same formation; 75' topographic tolerance. (Orders 43-63, 28-64.)	Frontier: Waterflood in progress.
Embar-Tensleep (Perm., Penn.)	6	Structural	Gravity Drainage		Embar-Tensleep: Waterflood in progress.
Madison (Miss.)	2	Structural	Water Drive		Madison: None.

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
FAIRVIEW Winnipegosis (Dev.) Red River (Ordovician)	1 4	Structural Structural	Water Drive Water Drive	(Red River & Winnipegosis) 160-acre spacing unit. Well location anywhere in spacing unit but no closer than 660' from unit boundary. (Orders 48-65, 1-67, 43-67, 44-67.)	None
FERTILE PRAIRIE Red River (Ordovician)	3	Structural	Water Drive	(Red River) 80-acre spacing units consisting of north-south rectangular units. Well location in NW $\frac{1}{4}$ and SE $\frac{1}{4}$ of quarter section with 75' topographic tolerance. (Orders 3-56, 7-62.)	None
FLAT COULEE Bow Island (Cret.) (Gas)	4	Structural and Strat.	Depletion	(Bow Island) Gas: 330' from boundary of legal subdivision and 1320' from other wells in same reservoir. (Order 16-55.) (Dakota) State-wide.	None
Dakota (Cret.) (Gas) Swift (Jur.) (Gas) Swift (Jur.) (Oil)	1 Shut-in 32	Strat. Strat. Strat.	Depletion Depletion Depletion	(Swift) Gas: State-wide gas spacing. (Swift) Oil 40-acre spacing units. Well in center of spacing unit with 150' topographic tolerance. Orders 16-62, 19-63.)	
FLAT LAKE Madison-Ratcliffe (Miss.)	57	Structural and Strat.	Partial Water Drive	(Ratcliffe) 160-acre spacing units; well location in center of NE $\frac{1}{4}$ of quarter section with 200' topographic tolerance. Wells no closer than 961' to No. Dakota state line and no closer than 1600' to Canadian line. (Orders 10-65 amended, and 43-65.)	Excess produced water disposed into Muddy, Dakota, or Lakota formations. (Orders 39-64, 39-66.)
FLAT LAKE, SOUTH Madison-Ratcliffe (Miss.)	1	Structural and Strat.	Partial Water Drive	(Ratcliffe) Same as Flat Lake spacing. (Order 2-67.)	None
FRANNIE (Mont. Portion) Tensleep (Penn.)	2	Structural	Comb. Water Drive and Gravity Drainage	(Tensleep) 10-acre spacing units; well location in center of each unit with 100' topographic tolerance. (Order 35-63.)	None
FRED & GEORGE CREEK Sunburst (L. Cret.)	22	Strat.	Depletion	(Sunburst) Oil: 40-acre spacing units; well location in center of unit with 250' topographic tolerance. (Orders 29-63, 1-65.)	None
Swift (U. Jur.)	19	Strat.	Depletion	(Swift) State-wide.	
GAGE Amsden (Penn.)	2	Structural	Water Drive	State-wide.	None

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
GAGE, SOUTHWEST Amsden (Penn.)	1	Unknown	Water Drive	Temporary 160-acre spacing expired. State-wide spacing now applies. (Order 50-65.)	None
GAS CITY Red River (Ordovician)	24	Structural	Water Drive	80-acre spacing units consisting of E½ and W½ of quarter sections; well location in NW¼ and SE¼ of quarter section; 150' topographic tolerance. Spacing waived and state-wide rules 213 (Deviation), 218 (Commingle) and 219 (Dual Completion) are waived in unitized portion of field. (Order 29-62.)	Excess produced water disposed into Judith River formation. (Orders 32-61, 20-64.)
CHARLES Charles (Miss.)	1	Structural	Unknown		
GLENDIVE Stony Mountain, Red River (Ordovician)	13	Strat. and Structural	Water Drive	(Stony Mountain, Red River) 80-acre spacing units consisting of any two adjacent quarter-quarter sections; wells located in center of NE¼ and SW¼ of each quarter section with 75' topographic tolerance. (Orders 27-55, 19-62, 58-62, 20-66.)	Excess produced water disposed into Swift and Dakota formations. (Orders 16-56, 16-63.)
GOOSE LAKE Ratcliffe (Miss.)	30	Structural and Strat.	Partial Water Drive	(Ratcliffe) 160-acre spacing units; well locations according to areas: Area I, center of NW¼ of quarter section; Area II, center of SE¼ of quarter section; Area III, center of NE¼ of quarter section. 200' topographic tolerance. (Orders 42-63, 40-66.)	Excess produced water disposed into Mission Canyon and Dakota formations. (Orders 12-64, 14-66.)
GRABEN COULEE Sunburst (L. Cret.)	0	Structural and Strat.	Depletion	(Sunburst) Oil: 40-acre spacing units; well location no closer than 330' from legal subdivision.	None
Cut Bank (L. Cret.)	20	Structural and Strat.	Depletion	(Cut Bank and Madison) Oil: 330' from boundary of legal subdivision and 650' from other well in same reservoir and on same lease. 75' topographic tolerance. (Order 73-62.)	
Madison (Miss.)	22	Structural and Strat.	Depletion		
GRANDVIEW Bow Island (Cret.) (Gas)	1	Structural	Unknown	Gas: (All formations.) 320-acre spacing units aligned in a north-south direction; well locations no closer than 660' to a spacing unit boundary. (Order 49-67.)	None
Swift (U. Jur.) (Gas)	1	Structural	Unknown	Oil: State-wide.	None
Madison (Miss.) (Gas)	1	Structural	Unknown		
GYPSY BASIN Sunburst (L. Cret.)	3	Structural and Strat.	Comb. Water Drive and Depletion	(Sunburst) Oil: 330' from lease lines and 660' between wells in same formation. Only two wells per quarter-quarter section. (Order 7-66.)	Order 6-64 permits injection of excessive gas (produced with oil) into the Sunburst gas cap.
Swift (U. Jur.)	1	Structural and Strat.	Comb. Water Drive and Depletion	(Swift) Oil: Same as Sunburst.	
Sawtooth-Madison (Jur. & Miss.)	5	Structural and Strat.	Comb. Water Drive and Depletion	(Sawtooth-Madison) Oil: 40-acre spacing units; wells no closer than 330' from lease line. (Order 7-66.)	
				(Sunburst and Madison) Gas: 160-acre spacing units; well locations in center of any quarter-quarter section in each 160-acre unit. 2340' between gas wells. 150' to topographic tolerance. (Order 13-59.)	

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
HARDIN Frontier (Cret.) (Gas)	38	Strat.	Volumetric	State-wide.	None
HIAWATHA Tyler (L. Penn.)	5	Structure	Depletion	State-wide.	None
HIBBARD Amsden (Penn.)	1	Unknown	Water Drive	State-wide.	None
IVANHOE Morrison (U. Jur.)	1	Structural and Strat.	Depletion	40-acre spacing unit for production from any one common formation; well location in center of unit with 200' topographic tolerance. (Order 7-60.)	Waterflood of Tyler B & C discontinued.
Amsden (L. Penn.)	2	Structural and Strat.	Water Drive		
Tyler (L. Penn.)	9	Structural and Strat.	Depletion		
KEG COULEE Tyler (Penn.)	28 /	Strat.	Depletion	(Tyler) 40-acre spacing in southwest portion of field except that spacing is waived in unitized portion. (Orders 3-64, 4-64, 23-64.) 80-acre spacing in remainder of field with variable pattern. (Orders 11-60, 28-62.) Topographic tolerance varies from 100' to 150'. (Orders 11-60, 4-64, 23-64.) Buffer zone waived. (Order 16-65.)	A waterflood of Tyler C sand in the unitized northwest portion of the field was commenced in August, 1967. (Orders 3-64, 28-66.)
KEG COULEE, NORTH Tyler "B" (Penn.)	3	Strat.	Depletion	40-acre spacing units; well location in center of spacing unit with 150' topographic tolerance. (Order 46-64.) Buffer zone waived (Order 16-65.)	None
KEITH, EAST (Gas) Blackleaf & Sawtooth (Gas) (Cret. & Jur.)	12	Structural	Water Drive	(Blackleaf & Sawtooth) State-wide gas spacing except in unitized portions that were spaced by Order 22-62.	None
KELLEY Tyler (Penn.)	2	Strat.	Depletion	State-wide.	None
KEVIN-SUNBURST Madison, Sunburst (Miss., L. Cret.)	679+	Strat.	Depletion	9 wells per 40-acre tract; only 3 wells on any side of tract set back at least 220' from line. Field delineated by Orders 8-54, 28-55.	There are four waterfloods in operation.
LAKE BASIN, NORTH Eagle, Frontier (Cret.) (Gas)	4	Structural	Unknown	(Frontier, Eagle) Gas: 640-acre gas spacing units consisting of one section. Well locations in center of NW¼ or SE¼ of each section with 75' topographic tolerance. (Order 6-58.)	None

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
LITTLE BEAVER (Mont. Portion) Red River (Ordovician)	29	Structural	Comb. Depletion and Water Drive	Spacing waived and General Rules No. 213 (Deviation), 218 (Commingle) and 219 (Dual Completion) are suspended until present Unit Agreement becomes inoperative. (Order 41-62.)	Waterflood of the Red River was commenced in August, 1967.
LITTLE BEAVER, EAST (Mont. Portion) Red River (Ordovician)	14	Structural	Comb. Depletion and Water Drive	Same as for Little Beaver. (Order 42-62.)	Waterflood of the Red River was commenced in April, 1965.
LODGE GRASS Tensleep (Penn.)	3	Structural	Water Drive	(Tensleep) 160-acre spacing units; well locations vary according to areas; 250' topographic tolerance. (Orders 26-64, 26-65.)	None
LOOKOUT BUTTE Madison (Miss.) Silurian-Ordovician	12 67	Structural Structural	Water Drive Comb. Depletion and Water Drive	(Madison) State-wide spacing. (Silurian-Ordovician) 160-acre spacing; well location in center of SE 1/4 of each quarter section with 150' topographic tolerance. (Order 21-62.) Coral Creek Unit not subject to spacing rules. Re-delineated per Order 7-63.	Water disposal into Madison. (Order 68-62.) Waterflood of Silurian-Ordovician in Coral Creek Unit approved in 1966. (Order 35-66.)
MASON LAKE Lakota (Cret.)	2	Structural	Water Drive	State-wide.	None
MELSTONE Tyler (Penn.)	4	Structural and Strat.	Depletion	State-wide.	None
MIDDLE BUTTE Blackleaf (Cret.) (Gas)	4	Structural	Volumetric	(Bow Island) Gas: 320-acre spacing units consisting of E 1/2 & W 1/2 of each section; well location in center of either of the inside quarter-quarter sections located in E 1/2 of each spacing unit. 75' topographic tolerance. (Order 3-66.)	None
MINERAL BENCH Charles "C" Duperow (Miss. & Dev.)	1	Structural	Water Drive	State-wide.	Water disposal into Dakota-Lakota per Order 18-65.
MINERS COULEE Swift (U. Jur.)	6	Strat.	Depletion	(Sunburst-Swift) 40-acre spacing units consisting of quarter-quarter sections; well location no closer than 330' from lease or property line and 660' from any other well.	None
MONARCH Madison (Miss.)	2	Structural and Strat.	Water Drive	(Madison) 80-acre spacing units consisting of east and west halves of quarter section. Well location in SW 1/4 & NE 1/4 of quarter section. Location within 660' square at center of quarter-quarter section. (Order 18-61.)	Produced water is disposed into the salt water disposal system for the Pennel Field.

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
INTERLAKE, RED RIVER (Silurian, Ordovician)	14	Structural and Strat.		(Siluro-Ordovician) 160-acre spacing units consisting of a quarter section; well location in center of SW 1/4 of quarter section with 175' topographic tolerance. (Orders 12-59, 4-63.)	
MOSSER Dakota (L. Cret.)	4	Structural	Water Drive	Spacing waived. Future development requires administrative approval of the Commission. (Order 27-62.)	None
MT. LILLY Madison (Miss.) (Gas)	2	Structural	Water Drive	(Madison) Gas; 640-acre, well location in approximate center of any of the four quarter-quarter sections adjoining center of section; 250' topographic tolerance. (Order 37-63.)	None
OUTLOOK Duperow (Dev.)	2	Strat. and Structural	Water Drive	(Duperow) State-wide spacing.	Produced water is disposed into Dakota and Siluro-Devonian formations. (Orders 16-59, 17-65, 36-66.)
Silurian-Devonian	9	Strat. and Structural	Water Drive	(Winnipegosis & Interlake) 160-acre spacing units; well location in center of either SW 1/4 or NE 1/4 of each quarter section; 175' topographic tolerance. (Order 19-59A.)	
OUTLOOK, SOUTH Winnipegosis (Dev.)	2	Structural	Water Drive	(Red River & Interlake-Winnipegosis) 160-acre spacing; permitted wells in either SW 1/4 or NE 1/4 of quarter section; 175' topographic tolerance. (Order 19-59A.)	Produced water disposed into Dakota formation. (Orders 19-59, 17-65.)
Red River (Ordovician)	1	Structural	Water Drive		
OUTLOOK, WEST Winnipegosis (Dev.)	2	Structural	Water Drive	(Winnipegosis) 160-acre spacing units consisting of quarter sections; permitted wells in either SW 1/4 or NE 1/4 with a tolerance of 175'. (Order 7-67.)	Produced water disposed into Dakota formation. (Order 42-66.)
PENNEL Madison (Miss.)	8	Structural	Water Drive	(Madison) 80-acre spacing units consisting of east and west half of quarter section; wells located in center of SE 1/4 and NW 1/4 of quarter sections with 150' topographic tolerance. (Order 15-61.)	Produced water is being injected into Siluro - Ordovician and Madison formations. (Orders 16-60, 46-62, 68-62, 36-63, 13-64.)
Siluro-Ordovician	108	Structural	Comb. Depletion and Water Drive	(Siluro-Ordovician) 80-acre spacing units on west side and 160-acre spacing units on east side of pool. Wells to be located in SE 1/4 and NW 1/4 of each quarter section (80 acres) and in SE 1/4 of each quarter section on 160-acre spacing. (Orders 1-56, 8-56, 15-61, 20-62, 4-63, 7-63.)	
PINE Siluro-Ordovician	130	Structural	Comb. Depletion and Water Drive	Spacing and General Rules 213, 218 and 219 are waived within the Pine Unit. 80-acre spacing units outside of unit area; well location in NW 1/4 and SE 1/4 of quarter section; 150' topographic tolerance. (Order 37-62.)	A waterflood program was started in 1959. A waterflood of the north area was approved in 1967. (Orders 13-68, 1-60, 8-62, 32-67.)
Mission Canyon (Miss.)	1	Structural	Water Drive		

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
PLEVNA					
Judith River, Eagle (Gas) (U. Cret.)	27	Structural	Water Drive	(Judith River, Eagle) Gas: 1200' from legal subdivision line; 2400' from other wells on same lease or unit; 75' topographic tolerance. (Orders 3-54, 4-57.)	None
POLE CREEK					
Amsden (Penn.)	4	Structural	Water Drive	State-wide.	None
PONDERA					
Madison (Miss.)	283	Structural and Strat.	Comb. Depletion and Water Drive	(Ellis, Sawtooth-Madison) Oil: 220' from legal subdivision, 430' from other wells in same reservoir on same lease; 75' topographic tolerance. Porter Bench Extension: 330' from legal subdivision line; 650' from other wells in same reservoir on same lease or unit; 75' topographic tolerance. (Order 9-54.) Gas: 1320' from legal subdivision line; 3700' from other wells on same lease or unit; 75' topographic tolerance. (Order 9-54.) General Rules 207, 211, 219, 221, 223, and 224 do not apply.	Produced water injected into lower Madison. (Orders 11-56, 15-56, 4-65, 4-66.) A small waterflood project has been in operation since 1959.
PONDERA COULEE					
Madison (Miss.)	4	Structural	Water Drive	330' from legal subdivision lines or upon a 10-acre spacing pattern; 75' topographic tolerance. (Order 5-62.)	None
POPLAR, EAST					
Madison (Miss.)	70	Structural	Water Drive	State-wide spacing; field delineated by Order 7-55.	Excess produced water has been injected into the Dakota and Judith River formations. (Orders 1-55, 5-57, 7-57, 14-61, 21-61, 34-61, 10-62.)
POPLAR, NORTHWEST					
Madison (Miss.)	5	Structural	Water Drive	80-acre spacing units consisting of E1/2 and W1/2 of each quarter section; permitted wells in NW1/4 and SE1/4 of quarter section. 75' topographic tolerance. (Order 18-55.)	None
PRAIRIE ELK					
Charles "C" (Miss.)	2	Unknown	Water Drive	State-wide.	None
RAGGED POINT					
Tyler (Penn.)	13	Strat.	Depletion	Tyler: 40-acre spacing units; 75' topographic tolerance. (Order 8-59.) Spacing waived for Tyler "A" sand reservoir within Tyler "A" Sand Unit except no well can be closer than 660' to Unit boundary. (Order 35-65.) Kibbey: State-wide spacing. (Order 15-54.) Commencing of production from Tyler and Kibbey permitted in one well per Order 11-65.	A waterflood project of the Tyler "A" sand was commenced in February, 1966. (Order 35-65.) Water disposal into Kibbey. (Order 19-65.)
RATTLESNAKE COULEE					
Sunburst (L. Cret.)	1	Strat.	Depletion	State-wide.	None

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
REAGAN Madison (Miss.)	47	Structural	Comb. Gas Cap and Water Drive	State-wide.	A pressure maintenance project utilizing gas injection was started in 1961. (Order 21-60.)
RED CREEK Cut Bank (L. Cret.)	10	Strat.	Depletion	(Madison, Sunburst & Cut Bank) 40-acre spacing units; well in center of spacing unit with 75' topographic tolerance; spacing waived for unitized portion. (Orders 16-58, 73-62, 31-64.)	Excess produced water injected into Bow Island and Madison. (Order 22-63, 37-64.) A waterflood project in the Cut Bank sand was initiated in June, 1965.
Madison (Miss.)	20	Structural	Water Drive		
RED FOX Nisku (Dev.)	1	Structural	Water Drive	(Nisku) Field consists of one 160-acre spacing unit which straddles the section line. (Order 20-67.)	None
REDSTONE Winnipegosis (Dev.)	1	Unknown	Water Drive	State-wide.	None
REPEAT Red River (Ordovician)	1	Unknown	Water Drive	State-wide.	None
RESERVE Winnipegosis (Dev.)	3	Structure	Water Drive	(Interlake, Red River & Winnipegosis) 160-acre spacing units; permitted well within 1320' square in center of quarter section. Commingling of Red River and Interlake production permitted on individual well basis. (Orders 34-66, 27-67.)	None
Interlake, Red River (Silurian-Ordovician)	1	Structure	Water Drive		None
RICHEY Charles (Miss.)	1	Structural	Water Drive	(Charles) 80-acre spacing units consisting of any two adjacent quarter-quarter sections; well locations in center of NW $\frac{1}{4}$ and SE $\frac{1}{4}$ of each quarter section; 75' topographic tolerance. (Order 21-55.)	Part of produced water is being injected into the Dakota formation. (Orders 10-58, 19-61.)
RICHEY, SOUTHWEST Interlake, Dawson Bay (Silurian, Devonian)	8	Structural	Depletion	(Devonian, Silurian, Ordovician) 160-acre spacing units; wells no closer than 900' from boundary of spacing unit. (Order 25-62.)	A waterflood project in the Interlake and Dawson Bay was started in 1965.
RUDYARD Sawtooth (Jurassic) (Gas)	3 Shut-in	Structural	Volumetric	(Sawtooth) Gas; 640-acre spacing units consisting of one section; well location in center of NW $\frac{1}{4}$ of section with 75' topographic tolerance. (Order 2-58.)	None
SAND CREEK Interlake, Red River (Silurian, Ordovician)	9	Structural	Water Drive	(Interlake and Red River) 80-acre spacing units consisting of any two adjacent quarter-quarter sections. Wells located in center of NW $\frac{1}{4}$ and SE $\frac{1}{4}$ of each quarter section. (Order 16-59.) Commingling of production from Interlake and Red River authorized per Order 49-62.	Excess produced water is injected into the Swift formation. (Order 9-61.)

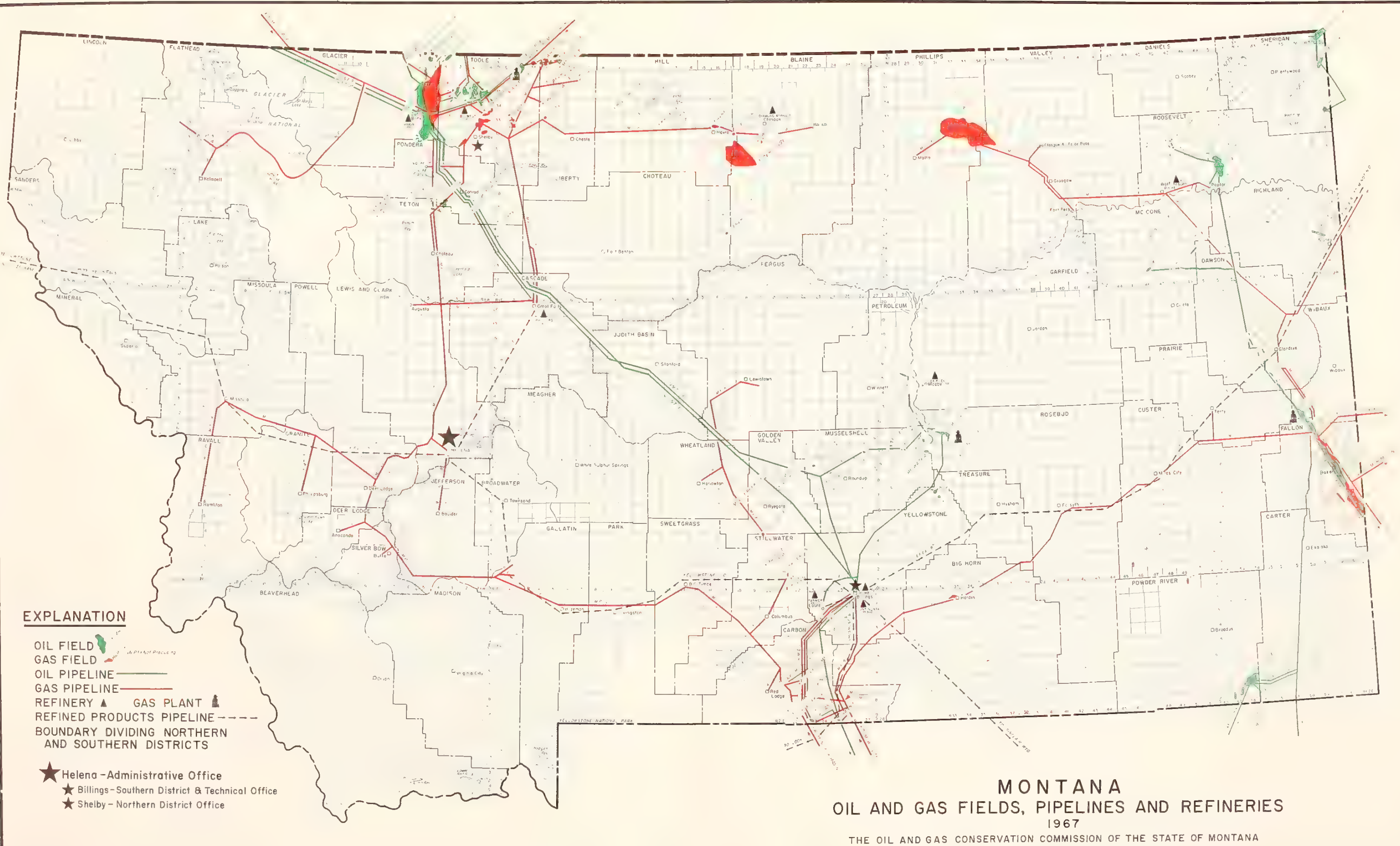
Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
SHOTGUN CREEK Madison (Miss.)	1	Structural	Water Drive	State-wide.	None
SIDNEY-BRORSON Mississippian (Miss.)	3	Structural	Water Drive	(Madison) 320-acre spacing units consisting of one-half section which may be either the east and west or north and south halves. Well location in NW¼ and SE¼ of each section; tolerance area consists of the center 40 acres in the NW¼ or SE¼ of each section. (Orders 30-62, 12-63.)	None
SMOKE CREEK McGowan (Miss.)	5	Structural	Water Drive	State-wide.	None
SYNDER Tensleep (Penn.)	4	Structural	Water Drive	10-acre spacing units with center 5-spot permitted; 150' topographic tolerance. (Order 45-62.)	None
SOAP CREEK Tensleep, Amsden, Madison (Penn., Miss.)	17	Structural	Water Drive	One well per 10-acre spacing unit per production formation; well location in center of spacing unit with 100' topographic tolerance. (Order 26-60.)	None
SPRING LAKE Nisku (Dev.)	1	Structural	Depletion	(Nisku, Red River) One well per 160-acre spacing unit. Well location anywhere within 840' square in center of spacing unit. (Order 6-63.)	None
Red River (Ordovician)	2	Structural	Depletion		
STENSIVAD Tyler (Penn.)	24	Strat.	Depletion	40-acre spacing units; well location in center of spacing unit with 200' tolerance. (Orders 2-59, 7-60.) Wells may be drilled anywhere within waterflood unit boundary, no closer than 660' from unit boundary. (Order 5-65 Amended.)	A waterflood operation has been in progress since 1963. (Orders 53-62, 9-67.)
SUMATRA Tyler (Penn.) Amsden (Penn.)	85 2	Strat. Strat. and Structural	Depletion Water Drive	40-acre spacing units; well located in center of unit with 75' tolerance. (Order 14-58.)	N.W. Sumatra Unit waterflood approved in 1967.
TULE CREEK Nisku (Dev.)	7	Structural	Water Drive	(Nisku) 160-acre spacing units with permitted well anywhere within 1320' square in center of each unit. (Orders 26-62, 6-65.)	Produced water injected into Dakota & Judith River formations.
TULE CREEK, EAST Nisku (Dev.)	2	Structural	Water Drive	(Nisku) 160-acre spacing units with permitted well anywhere within 1320' square in center of each unit. (Orders 40-46, 6-65.)	None

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
TULE CREEK, SOUTH Nisku (Dev.)	3	Structural	Water Drive	(Nisku) 160-acre spacing units with permitted well anywhere within a 1320' square in center of each unit.	Authority given to dispose of produced water into Dakota. (Order 44-64.)
UTOPIA Sawtooth, Madison (Gas) (Jurassic, Miss.)	6	Structural	Unknown	State-wide gas spacing.	None
VIDA Interlake (Silurian)	2	Structural	Water Drive	(Interlake) 160-acre spacing units with permitted well anywhere within an 840' square in center of each unit. (Order 39-63.)	None
VOLT Nisku (Dev.)	6	Structural	Water Drive	(Nisku) 160-acre spacing units with permitted well anywhere within a 1320' square in center of each unit. (Orders 27-64, 6-65.)	Excess produced water is disposed into Judith River. (Order 3-65.)
Charles (Miss.)	1	Structural	Water Drive	(Charles) State-wide spacing.	
WEED CREEK Amsden (L. Penn.)	4	Structural	Water Drive	State-wide.	None
WELDON Kibbey (Miss.)	16	Structural	Partial Water Drive	(Kibbey) 80-acre spacing unit; each quarter section divided into two separate units running in either a north-south or east-west direction; well location in center of NE $\frac{1}{4}$ and SW $\frac{1}{4}$ of quarter section with 200' topographic tolerance. (Order 9-65.)	Excess produced water is disposed into the Dakota and Morrison formations. (Orders 31-65, 47-65, 37-66.)
WHITLASH Blackleaf, Kootenai, Swift (Cretaceous, Jurassic)	44	Comb. Strat. and Struct.	Volumetric	Gas: 330' from legal subdivision line and 2400' between wells; 75' topographic tolerance. Oil: 330' from legal subdivision line and 650' between wells; 5-spot location at center of 40-acre tract permitted; 75' topographic tolerance. General Rules 207, 211, 219, 221, 223, and 224 suspended. (Order 16-54.)	None
WHITLASH, WEST Sunburst, Swift (Cretaceous, Jurassic)	15	Structural and Strat.	Volumetric	Gas: 160-acre spacing units consisting of quarter sections; well location anywhere within a 660' square in center of spacing unit. Oil: 330' from legal subdivision line, 650' between wells in same reservoir on same lease; 5-spot location permitted. (Order 61-62.)	None

Field, Formation	No. Prod. Wells	Type of Trap	Probable Drive Mechanism	Spacing Regulations and Field Rules	Secondary Recovery or Water Disposal
WILLS CREEK, SOUTH Siluro-Ordovician	2	Structural	Partial Water Drive	(Siluro-Ordovician) 160-acre spacing units. Well location in center of SE $\frac{1}{4}$ of each unit with 175' topographic tolerance. (Orders 5-64, 30-66.)	None
WOLF SPRINGS Amsden (Penn.)	10	Structural	Water Drive	(Amsden) 80-acre spacing units consisting of N $\frac{1}{2}$ and S $\frac{1}{2}$ of each quarter section. Well location in center of NW $\frac{1}{4}$ and SE $\frac{1}{4}$ of each quarter section with 75' topographic tolerance. (Orders 4-56, 9-59.)	None
WOODROW Charles, Duperow, Interlake, Red River (Miss., Dev., Silurian, Ordovician)	6	Structural	Water Drive	80-acre spacing units consisting of any two adjacent quarter-quarter sections; well locations in center of NE $\frac{1}{4}$ and SW $\frac{1}{4}$ of each quarter section with 200' topographic tolerance. (Order 47-62.)	Produced water injected into Dakota. (Order 48-62.)

STATE OF MONTANA - SUMMARY OF PRODUCING OIL FIELDS

LINE NO.	FIELD (OR POOL)	COUNTY	YEAR DISCOVERED	PRODUCTION FORMATION	APPROX. DEPTH	A.P.I. GRAVITY	VOLUME FACTOR	AVG. NET PAY FT.	AVG. POROSITY %	AVG. CONNATE WATER %	ORIGINAL OIL IN PLACE BBL/S/ACRE	PRODUCTIVE AREA 1-1-68 ACRES	ORIGINAL OIL IN PLACE 1000 BBL/S.	ESTIMATED RECOVERY FACTOR %		ORIGINAL RESERVES 1000 BBL/S.		TOTAL ORIGINAL RESERVES 1000 BBL/S.	CUMULATIVE PRODUCTION 1-1-68 1000 BBL/S.	REMAINING RESERVES 1-1-68 1000 BBL/S.	1967 PRODUCTION		ORIGINAL RECOVERABLE RESERVES		LINE NO.
														PRIMARY	SECONDARY	PRIMARY	SECONDARY				TOTAL BBL/S.	AVG. DAILY BOPD	BBL/S./ACRE	BBL/S./ACRE FT.	
1	Ash Creek (Montana)	Big Horn	1952	Shannon (U. Cret.)	4500	34	1.05	14	22	42	13,199	200	2,640	25	6	660	158	818	580	238	54,431	149	4,090	292	1
2	Beers Den	Liberty	1924	Sunburst (L. Cret.)	2300	39	1.08	20	12	35	11,205	200	2,241	17	--	381	--	381	310	71	15,090	41	1,905	95	2
3	Bell Creek	Powder River	1967	Muddy (Cret.)	4400	32	1.086	11.3	28	23	17,402	7,600	132,255	30	20	39,677	26,451	66,128	1,711	64,417	1,671,277	9,294	8,701	770	3
4	Benrud	Roosevelt	1961	Nisku (Dev.)	7650	43	1.41	22	16	30	13,557	80	1,085	20	--	217	--	217	155	62	16,915	46	2,713	123	4
5	Benrud, East	Roosevelt	1962	Nisku (Dev.)	7500	46	1.37	35	15	30	20,811	160	3,330	33	--	1,099	--	1,099	733	366	101,366	278	5,859	196	5
6	Benrud, Northeast	Roosevelt	1964	Nisku (Dev.)	7620	46	1.4	45	15.5	30	27,054	160	4,329	28	--	1,212	--	1,212	561	651	152,099	417	7,575	168	6
7	Big Wall	Hussellshell	1948	Tyler (Penn.)	3000	31	1.02	22	17	40	17,068	1,220	20,821	31	5	6,455	1,041	7,496	5,148	2,348	264,502	725	6,144	279	7
8	Big Wall	Hussellshell	1953	Amnden (Penn.)	2500	19	1.61	17	16	35	8,517	280	2,385	24	--	572	--	572	520	52	40,049	110	2,043	120	8
9	Blackfoot	Glacier	1955	Madison (Miss.)	3550	25	1.15	8	14	40	4,533	480	2,176	32	--	696	--	696	--	--	--	--	1,450	181	9
10	Blackfoot	Glacier	1955	Cut Bank (L. Cret.)	3500	30	1.11	15	15	35	10,221	160	1,635	20	--	327	--	327	860	163	41,849	115	2,044	136	10
11	Bowes	Blaine	1949	Sawtooth (M. Jur.)	3250	19	1.02	37	11.7	31	22,714	3,700	85,420	8	2	6,434	1,704	8,138	310	6.2	175,457	481	7,777	11	11
12	Cabin Creek	Fallon	1953	Siluro-Ordovician	8400	33	1.20	50	13	30	29,415	7,620	224,142	22	8	49,311	17,931	67,242	38,254	28,988	2,474,961	6,781	0,874	176	12
13	Cabin Creek	Fallon	1956	Mission Canyon (Miss.)	7300	33	1.13	25	11	30	13,215	2,259	29,853	35	--	10,449	--	10,449	6,753	3,696	922,686	2,528	4,625	185	13
14	Cat Creek (West Dome)	Petroleum	1920	Kootenai (L. Cret.)	1100	52	1.10	51	21	19	--	975	50,650	25	14	14,913	8,351	23,264	16,631	6,633	105,330	289	23,840	468	14
15	Cat Creek (Antelope-Mosby)	Petroleum, Garfield	1920	Kootenai (L. Cret.)	1225	52	1.10	10	21	19	11,997	200	2,399	22	11	528	264	792	264	--	--	--	3,960	396	15
16	Cat Creek	Petroleum, Garfield	1945	Morrison (U. Jur.)	1600	52	1.10	6	22	40	5,696	240	1,340	32	--	428	--	428	4,436	1,813	84,561	214	1,781	297	17
17	Cat Creek	Petroleum, Garfield	1945	Ellis (U. Jur.)	1750	52	1.10	25	18	40	19,050	880	16,764	30	--	5,029	--	5,029	--	--	84,561	214	5,715	229	17
18	Cat Creek	Petroleum	1967	Amnden (Penn.)	2025	52	1.0	10	8	30	4,344	40	174	20	--	35	--	35	34	44	1,362	44	875	88	1
19	Cut Bank	Glacier, Toole	1932	Kootenai (L. Cret.)	2900	38	1.09	18	15	35	12,452	49,000	612,108	20	11	122,422	67,332	189,754	103,810	85,944	3,259,049	8,929	3,873	215	15
20	Cut Bank	Glacier, Toole	1945	Madison (Miss.)	3000	39	1.10	10	14	30	6,911	3,200	22,115	28	--	6,192	--	6,192	5,617	575	133,374	317	1,235	194	20
21	Deer Creek	Dawson	1952	Red River (U. Ord.)	9900	41	1.2	90	7	30	28,530	400	1,712	15	--	1,712	--	1,712	1,015	683	23,642	65	4,279	48	21
22	Deer Creek	Dawson	1956	Interlake (Sil.)	9440	43	1.2	38	6.7	10	11,514	320	3,604	34	--	1,253	--	1,253	1,070	183	11,984	33	3,911	103	22
23	Dwyer	Sheridan	1960	Mission Canyon (Miss.)	8000	33	1.12	30	11.8	55	11,034	4,800	52,963	9	--	4,767	--	4,767	3,755	1,012	274,074	751	11,125	33	23
24	Elk Basin (Montana Portion)	Carbon	1915	Frontier (U. Cret.)	1200	45	1.16	30	21	20	33,720	120	4,046	--	33	--	4,046	1,299	--	2,324	4	11,125	371	24	24
25	Elk Basin (Montana Portion)	Carbon	1942	Embar-Tensleep (Perm.-Penn.)	5000	29	1.26	124	10.5	10	28,368	1,376	107,234	--	57	--	1,376	41,465	43,841	17,017	1,807,806	4,283	44,640	360	2
26	Elk Basin (Montana Portion)	Carbon	1946	Madison (Miss.)	5300	28	1.12	224	12	9	169,434	240	155,879	24	4	37,411	6,235	43,646	17,273	31,373	1,024,672	2,797	17,441	212	27
27	Elk Basin, Northwest	Carbon	1947	Frontier (U. Cret.)	3375	47	1.29	28	19	30	22,394	120	2,687	25	21	672	564	1,236	1,048	187	28,900	79	10,300	368	27
28	Elk Basin, Northwest	Carbon	1947	Madison (Miss.)	6215	35	1.08	124	12	35	69,477	200	13,895	13	--	1,806	--	1,806	955	40	14,567	40	9,030	73	28
29	Elk Basin, Northwest	Carbon	1964	Embar-Tensleep (Perm.-Penn.)	6000	37	1.15	27	11.5	27	16,338	580	9,475	15	13	1,421	1,212	2,633	690	1,941	106,113	291	4,574	169	29
30	Fairview	Richland	1967	Vinnepigosis (Dev.)	11450	43	1.1	23	2	30	7,949	160	1,272	15	--	191	--	191	74	117	73,842	410	1,194	52	30
31	Fairview	Richland	1965	Red River (U. Ord.)	12660	47	1.20	33	11	28	11,624	440	7,633	20	--	1,577	--	1,577	537	940	277,528	727	7,387	72	31
32	Fertile Prairie	Fallon	1952	Red River (U. Ord.)	9250	29	1.2	6	14	27	3,954	400	1,506	25	--	397	--	397	270	127	20,054	55	993	166	32
33	Flat Coulee	Liberty	1933	Swift (U. Jur.)	2900	37	1.1	18	21	35	17,329	1,280	22,181	12	11	2,612	2,440	5,052	1,722	3,380	215,304	550	3,985	221	31
34	Flat Lake	Sheridan	1964	Ratcliffe (Miss.)	6500	33	1.26	14	15	45	7,112	8,800	62,585	11	--	6,884	--	6,884	3,517	3,367	1,084,307	2			



GENERALIZED STRATIGRAPHIC CORRELATION CHART

SHOWING PRODUCING HORIZONS — MONTANA OIL AND GAS FIELDS, 1967

